3.2 LIMITING CONDITIONS FOR OPERATION	4.2 SURVEILLANCE REQUIREMENT
3.2 PROTECTIVE INSTRUMENT SYSTEMS	4.2 PROTECTIVE INSTRUMENT SYSTEMS
Specification (cont'd)	Specification (cont'd)
I. RECIRCULATION PUMP TRIP INSTRUMENTATION	I. RECIRCULATION PUMP TRIP INSTRUMENTATION
During reactor power operation, the Recirc. Pump Trip instrumentation shall be operative in accordance with Table 3.2.1.	The Recirc Pump Trip Instrumentation shall be functionally tested and calibrated in accordance with Table 4.2.1.
J. DEGRADED GRID PROTECTIVE SYSTEM	J. DEGRADED GRID PROTECTIVE SYSTEM
During reactor power operation, the emergency bus undervoltage instrumentation shall be operative in accordance with Table 3.2.7.	The emergency bus undervoltage instrumentation shall be functionally tested and calibrated in accordance with Table 4.2.7.

TABLE 3.2.7

Emergency Bus Undervoltage Instrumentation

Minimum Number of Operable Instruments	Parameter	Trip Setting	Required Action
2 per bus	Degraded Bus Voltage - Voltage (27/3Z, 27/3W, 27/4Z, 27/4W)	3,700 volts ±40 volts	Note 1
2 per bus	Degraded Bus Voltage - Time Delay (62/3W, 62/3Z, 62/4W, 62/4Z)	10 seconds ± 1 second	Note 2

TABLE 3.2.7 NOTES

1. If the minimum number of operable instrument channels are not available, the inoperable channel shall be tripped using test jacks or other permanently installed circuits within one hour.

2. If the minimum number of operable instrument channels are not available, reactor power operation is permissible for only 7 successive days unless the system is sooner made operable.

TABLE 4.2.7

Emergency Bus Undervoltage Instrumentation

Trip System	Functional Test	Calibration (8)
Degraded Bus Voltage	See Note 10	Once/Operating Cycle

TABLE 4.2 NOTES

1. Initially once per month; thereafter, a longer interval as determined by test results on this type of instrumentation.

2. During each refueling outage, simulated automatic actuation which opens all pilot valves shall be performed such that each trip system logic can be verified independent of its redundant counterpart.

3. Trip system logic calibration shall include only time delay relays and timers necessary for proper functioning of the trip system.

4. This instrumentation is excepted from functional test definition. The functional test will consist of injecting a simulated electrical signal into the measurement channel.

5. Check control rod position indication while performing the surveillance requirement of Section 3.3.

6. Functional tests, calibrations and instrument checks are not required when these instruments are not to be operable or tripped. Functional tests shall be performed before each startup with a required frequency not to exceed once per week. Calibration shall be performed prior to or during each startup or controlled shutdown with a required frequency not to exceed once per week. Instrument checks shall be performed at least once per day during those periods when instruments are required to be operable.

7. This instrumentation is excepted from the functional test definitions and shall be calibrated using simulated electrical signals once every three months.

8. Functional tests and calibrations are not required when systems are not required to be operable.

9. The thermocouples associated with safety/relief valves and safety valve position, that may be used for backup position indication, shall be verified to be operable every operating cycle.

10. Functional tests are not required for this instrumentation. The calibration performed once per operating cycle will adequately demonstrate proper equipment operation.

3.2 (Continued)

standby gas treatment system operation so that none of the activity released during the refueling accident leave the reactor building via the normal ventilation stack but that all activity is processed by the standby gas treatment system. Trip settings for the monitors in the ventilation duct are based upon initiation of the normal ventilation isolation and standby gas treatment system operation at a radiation level equivalent to the maximum release rate of $0.08/E_{\gamma}$ Ci/sec given in Specification 3.8.C.1.a. The monitoring system in the plant stack represents a backup to this system to limit gross radioactivity releases to the environs.

The purpose of isolating the mechanical vacuum pump line is to limit release of radioactivity from the main condenser. During an accident, fission products would be transported from the reactor through the main steamline to the main condenser. The fission product radioactivity would be sensed by the main steamline radiation monitors which initiate isolation.

The Degraded Grid Protective System has been installed to assure that safety-related electrical equipment will not be subjected to sustained degraded voltage. This system incorporates voltage relays on 4160 Volt Emergency Buses 3 and 4 which are set to actuate at the minimum voltage required to prevent damage of safety-related equipment.

If Degraded Grid conditions exist for 10 seconds, either relay will actuate an alarm to alert operators of this condition. Based upon an assessment of these conditions the operator may choose to manually disconnect the off-site power. In addition, if an ESF signal is initiated in conjunction with low voltage below the relay setpoint for 10 seconds, the off-site power will be automatically disconnected.

4.2 PROTECTIVE INSTRUMENTATION

The protective instrumentation systems covered by this specification are listed in Table 4.2. Most of these protective systems are composed of two or more independent and redundant subsystems which are combined in a dual-channel arrangement. Each of these subsystems contains an arrangement of electrical relays which operate to initiate the required system protective action.

The relays in a subsystem are actuated by a number of means, including manually-operated switches, process-operated switches (sensors), bistable devices operated by analog sensor signals, timers, limit switches, and other relays. In most cases, final subsystem relay actuation is obtained by satisfying the logic conditions established by a number of these relay contacts in a logic array. When a subsystem is actuated, the final subsystem relay(s) can operate protective equipment, such as valves and pumps, and can perform other protective actions, such as tripping the main turbine-generator unit.

4.2 (Continued)

With the dual-channel arrangement of these subsystems, the single failure of a ready circuit can be tolerated because the redundant subsystem or system (in the case of high pressure coolant injection) will then initiate the necessary protective action. If a failure in one of these circuits occurs in such a way that an action is taken, the operator is immediately alerted to the failure. If the failure occurs and causes no action, it could then remain undetected, causing a loss of the redundancy in the dual-channel arrangement. Losses in redundancy of this nature are found by periodically testing the relay circuits in the subsystems to assure that they are operating properly.

It has been the practice in boiling water reactor plants to functionally test protective instrumentation sensors and sensor relays on-line on a monthly frequency. Since logic circuit tests result in the actuation of plant equipment, testing of this nature was done while the plant was shutdown for refueling. In this way, the testing of equipment would not jeopardize plant operation. However, a refueling interval could be as long as eighteen months, which is too long a period to allow an undetected failure to exist.

This specification is a periodic testing program which is based upon the overall on-line testing of protective instrumentation systems, including logic circuits as well as sensor circuits. Table 4.2 outlines the test, calibration, and logic system functional test schedule for the protective instrumentation systems. The testing of a subsystem includes a functional test of each relay wherever practicable. The testing of each relay includes all circuitry necessary to make the relay operate, and also the proper functioning of the relay contacts. Functional testing of the inaccessible temperature switches associated with the isolation systems is accomplished remotely by application of a heat source to individual switches.

All subsystems are functionally tested, calibrated, and operated in their entirety if practicable. Certain exceptions are necessary because the actuation of certain relays would jeopardize plant operation or present an operational hardship.

For example, certain relays trip recirculation system discharge valves, and the actuation of these relays would cause a severe plant transient. In cases of this nature, the devices in the relay circuit will be tested, but the relay will only be actuated during a refueling outage. The number of relays in this category is very small compared to the total number of identical relays being tested on-line.